

Wormian bone or gunshot entry wound? – The complexity of forensic anthropology



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Abstract

Along sutural lines is common to find *wormian* bones or extrasutural ossicles. These are extra, small and irregular bones. The entry wound of a projectile is usually circular, small and beveled internally. Despite the differences between the two, it can sometimes be tricky to distinguish between a *wormian* bone and a gunshot entry wound.

The present case shows the complexity in the differentiation between the two. A *calvaria* that belongs to a collection of 38 identified calvarias with bone trauma, housed at the Institute of Legal Medicine and Forensic Sciences (INMLCF, I.P.) South Delegation, in Lisbon, was analyzed. For this *calvaria*, which belongs to an adult male who died in 1921, the autopsy report and cause of death were available. The *calvaria* has a *wormian* bone on the left L₁ and, on the right L₁, an absence of bone with the same shape and size as the *wormian* bone on the opposite side.

In a first analysis it was considered that the absence of bone was due to the fall of the *wormian* bone, however, after a closer inspection it was verified that the orifice presented characteristics of an entry gunshot wound. When analyzed the autopsy report, it was found that we were actually standing in front of a gunshot entry wound that occurred in the same place where there was a *wormian* bone.

Hence, this case shows an example of the complexity of trauma that we may come across in forensic anthropology and the need for a careful analysis of all injuries, as well as the interaction between forensic anthropology and forensic pathology.

Introduction

During skull formation, independent ossification centers may occur in the sutures and fontanels giving rise to extra ossicles called *wormian* bones (WB)^{2,12,13} that are usually small and irregular³. The reason for their appearance is unknown, however, it is believed that there are genetic or environmental factors^{2,6,12}. WB are more common in *lambdoid* sutures and are mostly found in Asian populations^{6,12}.

A gunshot wound may be characterized by mixed lesions. The shape of the orifices depend on the type of bone affected, area of impact, trajectory and velocity of the projectile, distance to which it was fired, the caliber of the projectile, shape and the type of weapon^{5,10,11}. More commonly, a cranial lesion of a gunshot wound is characterized by an entrance hole with a circular shape and internal bevel, while the exit hole has an irregular shape, a larger dimension than the entrance hole and external bevel^{4,5}. The exit hole is larger because the projectile undergoes deformation, becoming unstable after initial contact with the bone⁹.

Because of their shape and size, WB can be mistaken with trauma⁸, especially with gunshot wounds.

Case Description

The *calvaria* described in this work belongs to a collection of 38 identified *calvarias* with bone trauma from the INMLCF IP in Lisbon¹. The present case belongs to one of the 26 *calvarias* for which we have available the autopsy report.

The anthropological analysis showed that the *calvaria* belonged to a young male. The autopsy report confirmed a 65 years old male.

The initial anthropological analysis revealed a round-shape and irregular hole at the right L₁ with 18mm x 14mm (fig. 2). Internally this orifice has 24mm x 20mm. On the left L₁ is possible to see a *wormian* bone that has the same shape as the hole found in the right L₁ (fig. 1).

After a closely inspection of the orifice found it was possible to notice an inner *bevel* (fig. 3).

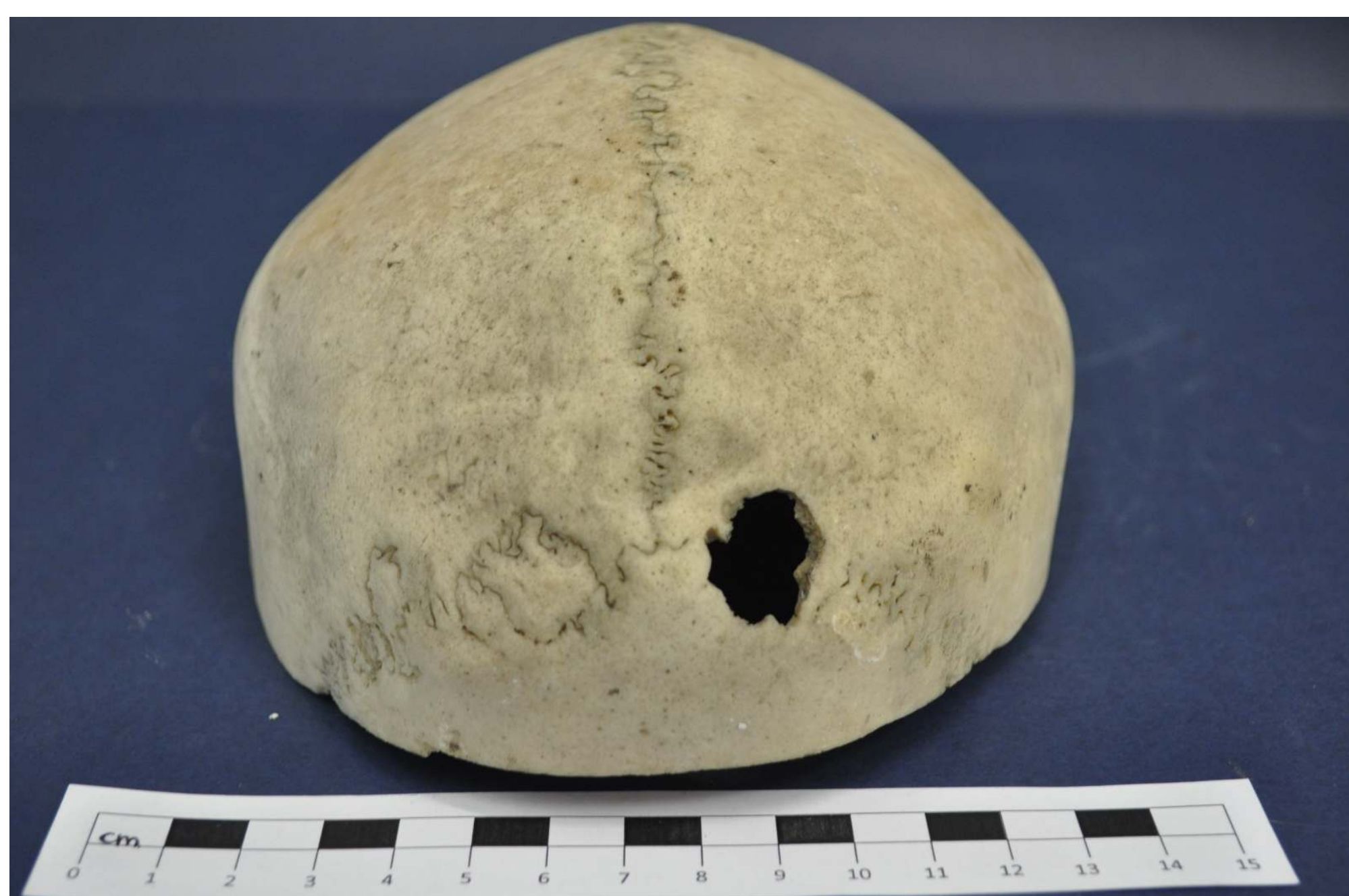


Fig 1—Posterior view of the *calvaria*, where is possible to observe a *wormian* bone in the left L₁ and an orifice in the right L₁.



Fig 2—Orifice found in the right L₁.



Fig 3 —Inferior view of the orifice found, where is possible to observe an inner *bevel*.

Discussion

During the anthropological analysis there were some doubts about the trauma observed in this *calvaria*, since it appears to be symmetrical to the WB found in the left L₁. For this reason, it became expected that the orifice found was in fact, a WB that felt *postmortem*.

After a close examination an internal bevel, a known characteristic of a gunshot entry wound, was found. So, could this orifice been caused by a gunshot wound that occurred in the exact same place where there was before a *wormian* bone? The hole has, in fact, characteristics of a *perimortal* gunshot wound, however, we could not give a certainty about the mechanism of the trauma.

At the autopsy report for this *calvaria* is possible to confirm that the absence of bone in the right *lambdoid* suture was, in fact, due to a gunshot wound that led to a cerebral and intra ventricular hemorrhage.

Without the autopsy report we couldn't assure that the trauma observed was a gunshot wound. In Machado *et al.*⁷ an orifice situated in a suture, that was thought to be a gunshot wound, was in fact a WB that felt.

This case shows how a forensic anthropology analysis can be tricky and the importance of the multidisciplinary work when dealing with dead bodies.

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